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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,208	12/28/2001	Jong-Hoon Yi	053785-5035	5390

9629 7590 12/24/2003

MORGAN LEWIS & BOCKIUS LLP
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EXAMINER	
RUDE, TIMOTHY L	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 12/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/029,208	YI ET AL.	
	Examiner	Art Unit	
	Timothy L Rude	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 December 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 December 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claims 3-6 are objected to because of the following informalities: The recitation "The color filter substrate according to claim" is not supported in the base claim (or intervening claim). For examination purposes "The color filter substrate according to claim" will be interpreted as -- The method according to claim --. Appropriate correction is required.

Claims 6, 12, and 18 are objected to because of the following informalities: The recitation "a top area of the spacer is within a range of about 5 x 5μm^2 to 10 x 10μm^2" is not in proper form. For examination purposes "a top area of the spacer is within a range of about 5 x 5μm^2 to 10 x 10μm^2" will be interpreted as -- a top area of the spacer is within a range of about 25μm^2 to 100μm^2 --. Appropriate correction is required.

Drawings

2. Figures 1-4 should be designated by a legend such as --Prior Art-- because only that which is old (Specification [0033]-[0036]) is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

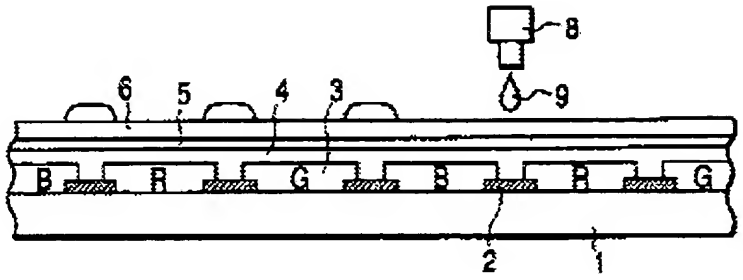
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4, 7-10, 13-16, and 19-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Hirose et al (Hirose) USPAT 6,501,527 B1.

As to claim 1, Hirose discloses in Figures 1A-1G and Figures 2-5 (col. 3, line 50 through col. 12, line 21) a method of fabricating a spacer for a liquid crystal display device, comprising the steps of forming a transparent electrode, 5, on a substrate (col. 3, lines 57-63); forming an orientation film, 6, on the transparent electrode; and forming a spacer, 10, on the orientation film by spraying a material, 9, through an ink-jet head, 8 (Applicant's inkjet nozzle).

Figure 1F



As to claim 2, Hirose discloses the method according to claim 1, wherein the spacer is dot-shaped (Figure 2 and col. 6, lines 1-20).

As to claim 3, Hirose discloses the method according to claim 1, wherein the spacer is formed from at least a transparent organic material mixed with a volatile solvent (col. 10, lines 12-47).

As to claim 4, Hirose discloses the method according to claim 3, wherein the transparent organic material is at least a resin of an acryl family (col. 10, lines 30-47).

As to claim 7, Hirose discloses in Figures 1A-1G and Figures 2-5 (col. 3, line 50 through col. 12, line 21) a color filter substrate, comprising: a substrate, 1, (col. 3, lines 57-63); a black matrix, 2, and sub-color filters, R, G, and B (meets Applicant's definition in Specification page 5, [0016]), formed on the substrate; a transparent electrode, 5, formed on the black matrix and the sub-color filter; an orientation film, 6, on the

transparent electrode; and a spacer, 10, formed on the orientation film, wherein an upper surface of the spacer is convex (see Figure 1G and Figure 2).

As to claim 8, Hirose discloses the color filter substrate according to claim 7, wherein the spacer is dot-shaped (Figure 2 and col. 6, lines 1-20).

As to claim 9, Hirose discloses the color filter substrate according to claim 7, wherein the spacer is formed from at least a transparent organic material mixed with a volatile solvent (col. 10, lines 12-47).

As to claim 10, Hirose discloses the color filter substrate according to claim 9, wherein the transparent organic material is at least a resin of an acryl family (col. 10, lines 30-47).

As to claim 13, Hirose discloses Figures 1A-1G and Figures 2-5 (col. 3, line 50 through col. 12, line 21) a method of fabricating a color filter substrate (col. 3, lines 57-63), comprising the steps of: forming a sub-color filter, R, G, and B (meets Applicant's definition in Specification page 5, [0016]), and a black matrix, 2, on a substrate; forming a transparent electrode, 5, on the sub-color filter and the black matrix; forming an orientation film, 6, on the transparent electrode; and forming a spacer, 10, on the orientation film by spraying a material, 9, through an ink-jet head, 8 (Applicant's inkjet nozzle).

As to claim 14, Hirose discloses the method according to claim 13, further comprising (col. 3, lines 57-63) the step of forming a protective layer, 4 (Applicant's planarization film), on the sub-color filter and the black matrix.

As to claim 15, Hirose discloses the method according to claim 13, wherein the spacer is formed from at least a transparent organic material mixed with a volatile solvent (col. 10, lines 12-47).

As to claim 16, Hirose discloses the method according to claim 15, wherein the transparent organic material is at least a resin of an acrylic resin (col. 10, lines 30-47).

As to claim 19, Hirose discloses the method according to claim 13, wherein the spacer is dot-shaped (Figure 2 and col. 6, lines 1-20).

As to claim 20, Hirose discloses the method according to claim 13, wherein (col. 3, lines 57-63) the spacer has a convex upper surface (see Figure 1G and Figure 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 5, 6, 11, 12, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirose.

As to claim 5, Hirose discloses the method according to claim 3.

Hirose does not explicitly disclose a method wherein a viscosity of the transparent organic material is within a range of about 3cp to 20cp.

Hirose teaches adjusting the viscosity of the organic material with a solvent (col. 10, lines 12-29) to preferably 3 to 50cp (col. 9, lines 53-56) at 25°C (overlaps

Applicant's 3cp to 20cp) to adjust the height of the spacer formed. Hirose teaches viscosity as a results effective variable, optimization of which takes only ordinary skill in the art of liquid crystals (MPEP 2144.05, II).

Hirose is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a viscosity of the transparent organic material is within a range of about 3cp to 20cp to adjust the height of the spacer formed.

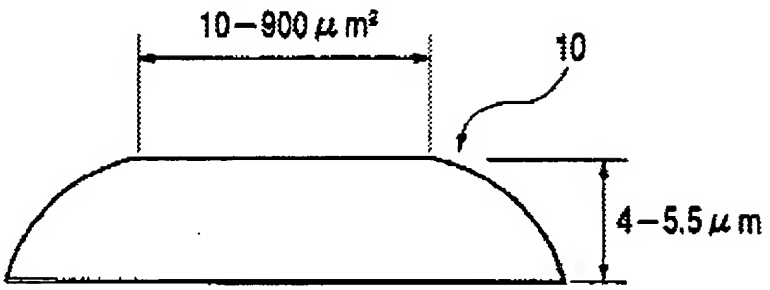
Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the method of Hirose to use a viscosity of the transparent organic material is within a range of about 3cp to 20cp to adjust the height of the spacer formed.

As to claim 6, Hirose discloses the method according to claim 1.

Hirose does not explicitly disclose a method wherein a height of the spacer is within a range of about 1μm to 5μm and a top area of the spacer is within a range of about 25μm^2 to 100μm^2.

Hirose teaches a method wherein a height of the spacer is within a range of about 4μm to 5.5μm in Figure 5 (overlaps Applicant's 1μm to 5μm) (col. 5, lines 63-65 and col. 7, lines 35-39) and a top area of the spacer is within a range of about 10-900 μm^2 (overlaps Applicant's 25μm^2 to 100μm^2) to avoid spacer collapse (col. 7, lines 26-39) and to avoid spacer shading (aperture reduction). Hirose teaches these ranges as a results effective variable, optimization of which takes only ordinary skill in the art of liquid crystals (MPEP 2144.05, II).

FIG. 5



Hirose is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a method wherein a height of the spacer is within a range of about 1μm to 5μm and a top area of the spacer is within a range of about 25μm^2 to 100μm^2 to avoid spacer collapse and to avoid spacer shading (aperture reduction).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the method of Hirose wherein a height of the spacer is within a range of about 1μm to 5μm and a top area of the spacer is within a range of about 25μm^2 to 100μm^2 to avoid spacer collapse and to avoid spacer shading (aperture reduction).

As to claim 11, Hirose discloses the color filter substrate according to claim 10.

Hirose does not explicitly disclose a color filter substrate wherein a viscosity of the transparent organic material is within a range of about 3cp to 20cp.

Hirose teaches adjusting the viscosity of the organic material with a solvent (col. 10, lines 12-29) to preferably 3 to 50cp (col. 9, lines 53-56) at 25°C (overlaps Applicant's 3cp to 20cp) to adjust the height of the spacer formed. Hirose teaches viscosity as a results effective variable, optimization of which takes only ordinary skill in the art of liquid crystals (MPEP 2144.05, II).

Hirose is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a viscosity of the transparent organic material is within a range of about 3cp to 20cp to adjust the height of the spacer formed.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the substrate of Hirose to use a viscosity of the transparent organic material is within a range of about 3cp to 20cp to adjust the height of the spacer formed.

As to claim 12, Hirose discloses the color filter substrate according to claim 7.

Hirose does not explicitly disclose a color filter substrate wherein a height of the spacer is within a range of about 1μm to 5μm and a top area of the spacer is within a range of about 25μm^2 to 100μm^2.

Hirose teaches substrate wherein a height of the spacer is within a range of about 4μm to 5.5μm in Figure 5 (overlaps Applicant's 1μm to 5μm) (col. 5, lines 63-65 and col. 7, lines 35-39) and a top area of the spacer is within a range of about 10-900 μm^2 (overlaps Applicant's 25μm^2 to 100μm^2) to avoid spacer collapse (col. 7, lines 26-39) and to avoid spacer shading (aperture reduction). Hirose teaches these ranges as

a results effective variable, optimization of which takes only ordinary skill in the art of liquid crystals (MPEP 2144.05, II).

Hirose is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a substrate wherein a height of the spacer is within a range of about 1μm to 5μm and a top area of the spacer is within a range of about 25μm^2 to 100μm^2 to avoid spacer collapse and to avoid spacer shading (aperture reduction).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the substrate of Hirose wherein a height of the spacer is within a range of about 1μm to 5μm and a top area of the spacer is within a range of about 25μm^2 to 100μm^2 to avoid spacer collapse and to avoid spacer shading (aperture reduction).

As to claim 17, Hirose discloses the method according to claim 16.

Hirose does not explicitly disclose a method wherein a viscosity of the transparent organic material is within a range of about 3cp to 20cp.

Hirose teaches adjusting the viscosity of the organic material with a solvent (col. 10, lines 12-29) to preferably 3 to 50cp (col. 9, lines 53-56) at 25°C (overlaps Applicant's 3cp to 20cp) to adjust the height of the spacer formed. Hirose teaches viscosity as a results effective variable, optimization of which takes only ordinary skill in the art of liquid crystals (MPEP 2144.05, II).

Hirose is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a viscosity of the transparent organic material is within a range of about 3cp to 20cp to adjust the height of the spacer formed.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the method of Hirose to use a viscosity of the transparent organic material is within a range of about 3cp to 20cp to adjust the height of the spacer formed.

As to claim 18, Hirose discloses the method according to claim 13.

Hirose does not explicitly disclose a method wherein a height of the spacer is within a range of about 1μm to 5μm and a top area of the spacer is within a range of about 25μm^2 to 100μm^2.

Hirose teaches a method wherein a height of the spacer is within a range of about 4μm to 5.5μm in Figure 5 (overlaps Applicant's 1μm to 5μm) (col. 5, lines 63-65 and col. 7, lines 35-39) and a top area of the spacer is within a range of about 10-900 μm^2 (overlaps Applicant's 25μm^2 to 100μm^2) to avoid spacer collapse (col. 7, lines 26-39) and to avoid spacer shading (aperture reduction). Hirose teaches these ranges as a results effective variable, optimization of which takes only ordinary skill in the art of liquid crystals (MPEP 2144.05, II).

Hirose is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a method wherein a height of the spacer is within a range of about 1μm to 5μm and a top area of the spacer is within a range of

about 25μm^2 to 100μm^2 to avoid spacer collapse and to avoid spacer shading (aperture reduction).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the method of Hirose wherein a height of the spacer is within a range of about 1μm to 5μm and a top area of the spacer is within a range of about 25μm^2 to 100μm^2 to avoid spacer collapse and to avoid spacer shading (aperture reduction).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703) 305-3492. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

Timothy L Rude
Examiner
Art Unit 2871

TLR

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800